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ASSIGNMENT BOOKLET 5A

MAT3037 Pure Mathematics 30
Module 5: Section 1 Assignment

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Date Assignment Submitted: _____	(If label is missing or incorrect) Student File Number: _____
Time Spent on Assignment: _____	Module Number: _____

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Pure MATHEMATICS 30

Module 5

Trigonometry

Assignment Booklet 5A

Learning Technologies Branch

Alberta Education

FOR TEACHER'S USE ONLY

Summary

	Total Possible Marks	Your Mark
Section 1 Assignment	30	

Teacher's Comments

Pure Mathematics 30
Module 5: Trigonometry
Assignment Booklet 5A
Section 1 Assignment
Learning Technologies Branch
ISBN 0-7741-2808-9

The Learning Technologies Branch acknowledges with appreciation the Alberta Distance Learning Centre and Pembina Hills Regional Division No. 7 for their review of this Assignment Booklet.

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Teachers	✓
Administrators	
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Other	

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ASSIGNMENT BOOKLET 5A
PURE MATHEMATICS 30: MODULE 5
SECTION 1 ASSIGNMENT

This Assignment Booklet is worth 30 marks out of the total 100 marks for the assignments in Module 5. The value of each assignment and each question is stated in the left margin.

Read all parts of your assignment carefully and record your answers in the appropriate places. If you have difficulty with an assignment, go back to your Student Module Booklet and review the appropriate activity. Be sure to proofread your answers carefully before submitting your Assignment Booklet.

(30)

Section 1 Assignment: Trigonometric Functions

Clearly show how you arrived at your answers by showing your work.

For questions 1 to 10, circle the correct response.

(1) **1.** An angle with a negative rotation passes through the point $(-5, -8)$. To the nearest degree, what is the measure of the angle?

A. $-238°$
B. $-148°$
C. $-122°$
D. $-58°$

(1) **2.** For $-180° < \theta < -90°$, which of the primary trigonometric functions is positive in this interval?

A. $\cos\theta$
B. $\tan\theta$
C. $\sin\theta$

(1) **3.** A central angle subtends an arc of 35 cm. If the radius of the circle is 12 cm, what is the measure of the central angle to the nearest degree?

A. $292°$
B. $173°$
C. $167°$
D. $2.9°$

(1) **4.** If $\sin\theta = -\frac{7}{8}$, then the value of $\frac{1}{\cot\theta}$ in the interval $\frac{3\pi}{2} < \theta < 2\pi$ is

A. $-\frac{\sqrt{15}}{7}$

B. $-\frac{7}{\sqrt{15}}$

C. $\frac{\sqrt{15}}{7}$

D. $\frac{7}{\sqrt{15}}$

(1) **5.** What is the exact value of $\sin\frac{5\pi}{6}$?

A. $\frac{1}{2}$

B. $-\frac{1}{2}$

C. $\frac{\sqrt{3}}{2}$

D. $-\frac{\sqrt{3}}{2}$

(1) **6.** The exact value of $\sin\frac{-145\pi}{3}$ is

A. $\frac{1}{2}$

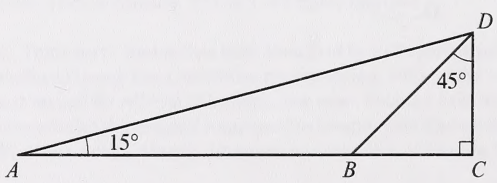
B. $-\frac{1}{2}$

C. $\frac{\sqrt{3}}{2}$

D. $-\frac{\sqrt{3}}{2}$

(1) **7.** In the triangle shown, AC is 194 cm. What is the length of BD to the nearest centimetre?

A. 72 cm
B. 73 cm
C. 74 cm
D. 75 cm



(1) **8.** What is the period of the graph of $y = 2\sin 3A$?

A. 90°
B. 120°
C. 180°
D. 360°

(1) **9.** Which of the following is the period of the function $y = \sin\frac{x}{4}$?

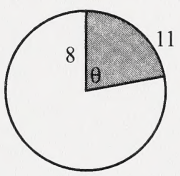
A. 8π
B. 4π
C. $\frac{\pi}{2}$
D. $\frac{\pi}{4}$

(1) **10.** The domain of the function $y = \tan x$ is

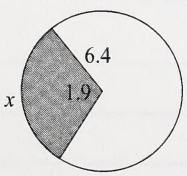
A. $x \in R$
B. $-1 < x < 1$
C. $x \neq n\pi$, where $n \in I$
D. $x \neq \frac{\pi}{2} + n\pi$, where $n \in I$

11. Determine the measure of the following. Round your answers to the nearest tenth.

(1) **a.** sector angle θ (in radians)



(1) **b.** arc x



(2) **12.** Determine one positive and one negative coterminal angle for -200.

(2) **13.** Are $-\frac{5\pi}{9}$ and $\frac{5\pi}{9}$ coterminal angles?

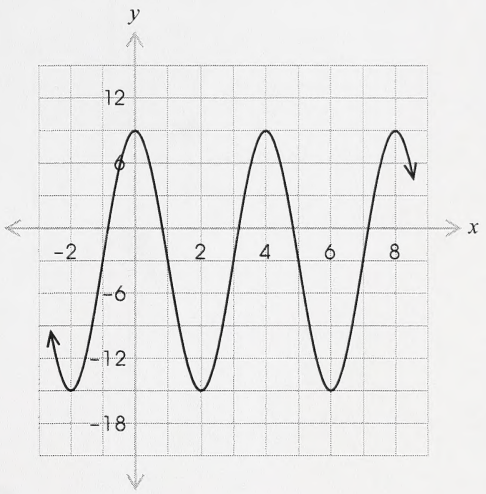
(4) **14.** Complete the following chart relating degree and radian measures. Express your answers to 2 decimal places when appropriate.

Degrees	45		228		-36		34.5	
Radians		3.7		-1.4		$\frac{7\pi}{12}$		$-\frac{9\pi}{16}$

(3) **15.** Calculate the values of $\sin\theta$, $\cos\theta$, and $\tan\theta$ if the terminal arm of θ in standard position contains the point $P(3, 4)$.

(3) **16.** Find the amplitude, period, phase shift, and vertical displacement for $y = \sqrt{7}\cos[5(x-85°)]-1.2$ compared to $y = \cos x$.

(4) **17.** The following graph represents a sine function in the form $y = A \sin B(x + C) + D$ or a cosine function in the form $y = A \cos B(x + C) + D$. Write an equation of the graph in both forms.



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ASSIGNMENT BOOKLET 5B

MAT3037 Pure Mathematics 30
Module 5: Section 2 Assignment and Final Module Assignment

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Time Spent on Assignment: _____	Module Number: _____

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Pure MATHEMATICS 30

Module 5

Trigonometry

Assignment Booklet 5B

Learning Technologies Branch

Alberta EDUCATION

FOR TEACHER'S USE ONLY

Summary

	Total Possible Marks	Your Mark
Section 2 Assignment	35	
Final Module Assignment	35	
	70	

Teacher's Comments

Pure Mathematics 30
Module 5: Trigonometry
Assignment Booklet 5B
Section 2 Assignment and Final Module Assignment
Learning Technologies Branch
ISBN 0-7741-2809-7

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ASSIGNMENT BOOKLET 5B
PURE MATHEMATICS 30: MODULE 5
SECTION 2 ASSIGNMENT AND FINAL MODULE ASSIGNMENT

This Assignment Booklet is worth 70 marks out of the total 100 marks for the assignments in Module 5. The value of each assignment and each question is stated in the left margin.

Read all parts of your assignment carefully and record your answers in the appropriate places. If you have difficulty with an assignment, go back to your Student Module Booklet and review the appropriate activity. Be sure to proofread your answers carefully before submitting your Assignment Booklet.

35

Section 2 Assignment: Trigonometric Equations

Clearly show how you arrived at your answers by showing your work.

For questions 1 to 7, circle the correct response.

(1) **1.** The exact value of $6\cos\left(\frac{-61\pi}{6}\right) - 2\sin\left(\frac{13\pi}{4}\right)$ is

A. $3\sqrt{3}+\sqrt{2}$

B. $-3+\sqrt{2}$

C. $-3-\sqrt{2}$

D. $3\sqrt{3}-\sqrt{2}$

(1) **2.** If $2\cos A - 1 = 0$, where $0 \le A < 2\pi$, then A is equal to

A. $\frac{2\pi}{3}, \frac{5\pi}{3}$

B. $\frac{2\pi}{3}, \frac{4\pi}{3}$

C. $\frac{\pi}{3}, \frac{2\pi}{3}$

D. $\frac{\pi}{3}, \frac{5\pi}{3}$

(1) **3.** The graph of $y = \tan\theta$ intersects the graph of $y = -1$ at

A. $\theta = \frac{\pi}{4} + n\pi$, where n is any integer

B. $\theta = \frac{\pi}{4} + 2n\pi$, where n is any integer

C. $\theta = \frac{3\pi}{4} + n\pi$, where n is any integer

D. $\theta = \frac{3\pi}{4} + 2n\pi$, where n is any integer

(1) **4.** If $9\cos^2\theta + 3\cos\theta = 0$, where $90° < \theta < 180°$, what is the value of θ, correct to the nearest tenth?

A. 109.1°
B. 109.5°
C. 109.9°
D. 110.3°

(1) **5.** Which of the following is an x-intercept of the graph of $y = 3\sin 2x$?

A. 330°
B. 270°
C. 60°
D. 45°

(1) **6.** For $\frac{\csc^2 A - 1}{\cot A \csc A}$, what is the simplest equivalent trigonometric expression?

A. $\sin A$
B. $\cos A$
C. $\tan A$
D. $\csc A$

(1) **7.** Another form of $\cos(30° - A) + \sin(60° + A)$ is

A. $\sin x$

B. $\sqrt{3}\cos A + \sin A$

C. $\frac{\sqrt{3}}{2}\sin A + \cos A$

D. $\sqrt{2}\sin A + \cos A$

(4) **8.** Sketch the graphs of $y = \cos 2x$ and $y = -0.5$ over the domain $-\pi \leq x \leq \pi$. Use an algebraic method to determine the values of x where these two graphs intersect. Use exact values.

(4) **9.** Determine the general solution to $\sin \frac{x}{2} = \frac{\sqrt{3}}{2}$. Use radian measure in your solution.

10. Solve the following for x, where $0 < x < 2\pi$.

(2) **a.** $2 \tan x + \sqrt{12} = 0$

(2) **b.** $2 \cos^2 x + \cos x = 1$

(2) **11.** Write the general solutions to the equations in questions 10.a. and 10.b.

12. For $\sin\theta + \cos\theta \cot\theta = \csc\theta$, do the following:

(2) **a.** Show that the equation is true when $\theta = 30°$. Use exact values.

(2) **b.** Prove the equation algebraically.

(2) **c.** State any restrictions to the equation.

_____

_____

_____

(2) **13. a.** Solve $11 \sin^2 y = 13 - 3 \sin^2 y$ for y, where $0 \leq y < 360°$. How many angles satisfy this equation? Round your answer to the nearest tenth.

(1) **b.** What second-quadrant angle satisfies this equation?

_____

(1) **c.** What fourth-quadrant angle satisfies this equation?

_____

(4) **14.** Solve $2 \sin^2 \theta - 7 \sin \theta = -3$ for θ, where $0 < \theta \leq 360°$.

35

Final Module Assignment

Clearly show how you arrived at your answers by showing your work.

For questions 1 to 12, circle the correct response.

(1) **1.** Of the six trigonometric ratios, if only cosine and secant are positive, the angle is in the

A. first quadrant
B. second quadrant
C. third quadrant
D. fourth quadrant

(1) **2.** For an angle of 214°, the reference angle and value of sin 214° are

A. $214° - 180°, \sin(214° - 180°)$
B. $214° - 180°, -\sin(214° - 180°)$
C. $270° - 214°, -\sin(270° - 214°)$
D. $270° - 214°, \sin(270° - 214°)$

(1) **3.** What is the exact value of $\tan\frac{5\pi}{6}$?

A. $\sqrt{3}$

B. $\frac{\sqrt{3}}{3}$

C. $-\sqrt{3}$

D. $-\frac{\sqrt{3}}{3}$

(1) **4.** What is the exact value of $\sin\left(-\frac{19\pi}{6}\right)$?

A. $\frac{1}{2}$

B. $-\frac{1}{2}$

C. $\frac{\sqrt{3}}{2}$

D. $-\frac{\sqrt{3}}{2}$

(1) **5.** What is the exact value of $\sin^2 \frac{\pi}{6} - 2 \sin \frac{\pi}{6} \cos \frac{\pi}{6} + \cos^2 \left(-\frac{\pi}{6}\right)$?

A. $2 - \sqrt{3}$

B. $\frac{2 - \sqrt{3}}{2}$

C. $\frac{2 + \sqrt{3}}{2}$

D. $2 + \sqrt{3}$

(1) **6.** If $\cos \theta = -\sin \theta$, then $\sin^2 \theta$ is

A. $\frac{1}{4}$

B. $\frac{1}{2}$

C. $\frac{\sqrt{2}}{2}$

D. $-\frac{\sqrt{2}}{2}$

(1) **7.** For the equation $4 \cos \theta - \sqrt{12} = 0$, where $0 < \theta \leq 2\pi$, determine the measure of θ.

A. $\frac{\pi}{3}, \frac{5\pi}{3}$

B. $\frac{2\pi}{3}, \frac{4\pi}{3}$

C. $\frac{5\pi}{6}, \frac{7\pi}{6}$

D. $\frac{\pi}{6}, \frac{11\pi}{6}$

(1) **8.** If $\cos^2\theta - 6\sin 2\theta = 0$, one value of θ is

A. 0
B. 90°
C. 180°
D. 255°

(1) **9.** The period of the function $y = \tan\frac{x}{2}$ is

A. π
B. $\frac{\pi}{2}$
C. 2π
D. 4π

(1) **10.** For the graph of $y = 2\sin 3x$, which of the following is **not** an x-intercept?

A. 60°
B. 90°
C. 240°
D. 2π rad

(1) **11.** For $\frac{\tan A}{\sec A}$, what is the simplest equivalent trigonometric expression?

A. $\sin A$
B. $\cos A$
C. $\csc A$
D. $\cot A$

(1) **12.** What is another form of $\dfrac{\sin(A+B)\sin(A-B)}{\cos^2 A\cos^2 B}$

A. $\cos^2 A - \cos^2 B$
B. $\tan^2 A - \tan^2 B$
C. $\tan^2 A - \tan^2 B$
D. $\sin^2 A - \sin^2 B$

(6)

13. In Prince Albert, Saskatchewan, the Sun rises at 09:17 on December 21 and at 04:35 on June 22. Because there is no daylight savings time in Saskatchewan, the time the Sun rises on any other date can be predicted from a sinusoidal graph with a period of 365 days.

Write a sinusoidal equation that relates the time the Sun rises to the day of the year.

14. Prove each of the following identities algebraically.

(3) **a.** $\cos\theta + \cos\theta \tan^2\theta = \sec\theta$

(3) **b.** $\cos\theta(\sec\theta - \csc\theta) = 1 - \cot\theta$

(5) **15.** Solve $\sin 2y = \cos 4y$ for y, where $0 \leq y < 360°$. **Hint:** $\cos 4y = \cos(2y + 2y)$

(1) **16.** Find the exact value of $\cos 8° \cos 38° + \sin 8° \sin 38°$.

(5) **17.** Prove the identity $\frac{\sin^2\theta}{1-\cos\theta} = \frac{\sec\theta + 1}{\sec\theta}$.

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